

WHAT IS CLAIMED IS:

1 1. A micro electromechanical systems (MEMS) device comprising:
2 a scanning probe microscopy (SPM) component; and
3 one or more fluidic channels formed in the SPM component.

1 2. The MEMS device of claim 1 wherein the SPM component is used for
2 nanomachining.

1 3. A micro electromechanical systems (MEMS) device comprising:
2 a scanning probe microscopy (SPM) component;
3 at least one fluidic channel formed in the SPM component; and
4 a venturi tube formed along a portion of the fluidic channel,
5 wherein a vacuum can be developed by a flow of a gas or fluid through venturi
6 tube.

1 4. A micro electromechanical systems (MEMS) device comprising:
2 scanning probe microscopy (SPM) component;
3 a fluidic channel formed in the SPM component, the fluidic channel
4 configured to deliver fluid to a tip of the SPM component;
5 an amount of an isotope disposed along the fluidic channel,
6 wherein the particles emitted by the isotope can be delivered by a fluid
7 flowing in the fluidic channel to the tip to affect the charge distribution in a region about the
8 tip.

1 5. The MEMS device of claim 4 wherein the particles delivered to the tip
2 can be used to perform nanomachining on a workpiece.

1 6. A micro electromechanical systems (MEMS) device comprising:
2 scanning probe microscopy (SPM) component;
3 an amount of an isotope disposed on the SPM component;
4 a circuit for collecting particles emitted from the isotope to store an
5 accumulated charge; and
6 a contact formed on the circuit to provide an amount of current that can be
7 produced from the accumulated charge.

1 7. The MEMS device of claim 6 wherein the amount of isotope
2 comprises an isotopic charge emitter, wherein the accumulated charge can serve as a source
3 for local electrical power to operate active electronic elements located on or near the MEMS
4 device.

1 8. The MEMS device as recited in claim 4 which uses Americium 241.

1 9. The MEMS device as recited in claim 4 wherein the amount of isotope
2 is disposed in a single isotopic region on the SPM device, wherein the single isotopic region
3 contains 1 microcurie or less of radioactivity.

1 10. The MEMS device such as in claim 4 wherein the amount of isotope
2 comprises a plurality of isotopic regions, each of which contains 1 microcurie or less of
3 radioactivity.

1 11. Any nanocavitation technique which uses an nanocavitation inducing
2 member to image or measure the surface to which the cavitation is to interact with by a
3 Scanning Probe Microscopy Method.

1 12. Any nanoelectric discharge machining in which the electric discharge
2 tool also serves to image or measure the surface to be machined by any Scanning Probe
3 Microscopy Method.

1 13. Any outflow, inflow, circulating or recirculating fluid system in which
2 the Scanning Probe Microscopy means is integrated with the fluid transfer means.

1 14. Any outflow, inflow, circulating or recirculating fluid system in which
2 nanomachining or surface modification by any means is conducted by a means integrated
3 with said means.

1 15. The device such as described in claim 4 in which an integrated or
2 external circuit monitors the charge build up which is inversely proportional to rate of gas
3 flow through the system removing charge from the channels.

1 16. The device as described in claim 1 in which local or integrated pumps
2 and/or valves provide for the delivery and/or control of fluids or gases.

1 17. The device as described in 16 above in which the fluid channel also
2 functions as an active mechanical or electromechanical member.

1 18. The device as described in 16 above in which the movable members
2 act as passive elements.

1 19. The device as described in 16 above in which the movable members
2 act as passive elements and are activated or operated by external mechanical, vacuum, or
3 fluid induced forces.

1 20. The device as described in 16 above in which the movable members
2 act independently to provide new functions.

1 21. The device as described in 16 above in which the movable members
2 act independently to provide scanning or motion for any reason in or near the plane of the
3 cantilever.

1 22. The device as claimed in 4 which is a composed of a diode or
2 electrically similar region in close proximity to the emitted radiation.

1 23. Any system for Scanning Probe Microscopy, Nanomachining,
2 Nanomanipulation, or multimode operation in which the mechanical, electrical, electro-
3 optical, radiological, are changed by mechanical or electrical means.

1 24. Any system for Scanning Probe Microscopy, Nanomachining,
2 Nanomanipulation, or multimode operation in which the modality of operation is obtained by
3 use of mechanical members interacting with or substituting for the primary sense or
4 interaction structure.

1 25. The device of claim 4 which is composed of a diode formed by an
2 intrinsic layer of diamond coupled with a doped layer of diamond.

1 26. Any application, measurement or operation in which the device of 10
2 acts in a specific or constrained region.

1 27. Any application, measurement or operation as in 26 in which the
2 application uses chemical or biological chips or devices in which material for the operation,
3 application or measurement is placed in wells in a regular arrangement on a plane or
4 surface(s).

1 28. Any application, measurement or operation as in 26 in which the
2 target material is DNA which has been marked optically, electrically or chemically so as to
3 interact with optical, electrical or chemical detectors or emitters associated with or integrated
4 in the device.

1 29. The device as described in 16 above in which the movable members
2 act independently and are electrically sensed and this information or sense current or voltage
3 used to control the movable members.

1 30. The device as described in 16 above in which the movable members
2 act independently and are electrically sensed and this information or sense current or voltage
3 used to obtain a particular motion or displacement of the structure the arms act on including
4 obtaining zero displacement.

1 31. The device in claim 4 in which the layers comprising the device consist
2 of a conductor, intrinsic diamond and a conductor as successive layers.

1 32. The device of claim 4 in which the layers comprising the device
2 consist of boron doped diamond, intrinsic diamond and a conductor as successive layers.

1 33. The device of claim 4 in which the layers comprising the device
2 consist of boron doped diamond, intrinsic diamond and a doped SiC as successive layers.

1 34. The device of claim 4 in which the layers comprising the device
2 consist of boron doped diamond, intrinsic silicon carbide and a conductor as successive
3 layers.

1 35. The device of claim 4 in which the layers comprising the device
2 consist of boron doped diamond, intrinsic silicon carbide and doped silicon carbide as
3 successive layers.